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Board of water
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Board of Water Well Contractors

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BOARD OF WATER WELL CONTRACTORS

MONTANA CODES ANNOTATED
ADMINISTRATIVE RULES OF MONTANA

TITLE 37, CHAPTER 43, MCA

TITLE 36, CHAPTER 21, ARM

MAY, 1989



Board of Water Well Contractors' Members:

Wesley Lindsay, Chairman
Lindsay Drilling
Clancy, MT 59634

Ron Guse, Vice-Chairman
Department of Natural Resources
and Conservation
1520 East Sixth Avenue
Helena, MT 59620

Dan Fraser
Department of Health and
Environmental Sciences
Capitol
Helena, MT 59620

William F. Osborne
Liberty Drilling
3850 Highway 93 South
KalisPELL, MT 59901

Wayne Van Voast
Montana Bureau of Mines & Geology
EMC-Box 112
1500 North 30th
Billings, MT 59101

Board Office: Diana C. Cutler, Program Specilist
1520 East Sixth Avenue
Helena, MT 59620
(406) 444-6643



CHAPTER 43

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TITLE 37, CHAPTER 43
MONTANA CODE ANNOTATED

2-15-3307. BOARD OF WATER WELL CONTRACTORS.

(1) There is a board of water well contractors.

(2) The board shall be composed of five voting members, consisting of:

(a) one technical advisor hydrogeologist appointed by the Montana bureau of mines and geology;

(b) two licensed Montana water well contractors appointed by the governor with the concurrence of the senate;

(c) one appointed by the director of natural resources and conservation; and

(d) one appointed by the director of health and environmental sciences.

(3) The members of the board shall have been bona fide residents of this state for a period of at least 3 years prior to such appointment.

(4) The members of the board shall serve for a term of 3 years. In case of a vacancy in the office of a member of the board, an appointment shall be made to fill the same in the manner prescribed by the constitution and laws of this state.

(5) The members of the board shall, upon entering on the duties of their office, take and subscribe to the oath specified in the constitution of Montana, and such oath shall be filed in the office of the secretary of state.

(6) The board is allocated to the department for administrative purposes only as prescribed in 2-15-121.

Part 1
General

37-43-101. PURPOSE. It is the purpose of this chapter to reduce and minimize the waste and contamination of ground water resources within this state by reasonable regulation and licensing of drillers or makers of water wells and monitoring wells and to protect the health and general welfare by providing a means for the development of the natural resource of underground water in an orderly, sanitary, and reasonable manner. The reasonable regulation and licensing of drillers or makers of water wells and monitoring wells is in the best interest of the public, and the waste and contamination of ground water resources through inefficient or incompetent operations of drillers or makers of water wells and monitoring wells is prohibited. For the protection of the public and for the conservation of underground water resources, it is necessary that standards be set and maintained to insure that competency in the drilling and making of water wells and monitoring wells in this state is obtained.

37-43-102. DEFINITIONS. Unless the context requires otherwise, in this chapter the following definitions apply:

(1) "Apprentice water well driller" means an individual who is learning the trade of water well drilling and performs labor

and services for a licensed water well contractor and whose duties are directly related to well drilling or drilling rig operation.

(2) "Board" means the board of water well contractors provided for in 2-15-3307.

(3) "Department" means the department of natural resources and conservation provided for in Title 2, chapter 15, part 33.

(4) "Geotechnical boring" means a hole intended solely to determine the composition, stability, density, movement, pressure, stratigraphy, or other physical properties of soil or rock.

(5) "Monitoring well" means a well that is used for pollutant recovery or monitoring groundwater quality, groundwater levels, or flow direction, but whose primary purpose is not the withdrawal or acquisition of groundwater. Monitoring well does not include geotechnical borings, perk test holes, and groundwater exploration holes that are used to determine suitability of onsite sewage disposal by septic tank drain fields or lagoons.

(6) "Monitoring well constructor" means a natural person who installs monitoring wells.

(7) "Water well" means an excavation that is drilled, cored, bored, washed, driven, dug, jetted, or otherwise constructed and intended for the location, diversion, artificial recharge, or acquisition of groundwater. The term does not include spring development or excavations, by backhoe or otherwise, for recovery and use of surface waters or for the purpose of stock watering or irrigation where the depth is 25 feet or less. The term does not include an excavation made for the purpose of obtaining or prospecting for oil, natural gas, minerals, or products of mining or quarrying or for inserting media to repressure oil- or natural-gas-bearing formations or for storing petroleum, natural gas, or other products.

(8) "Water well contractor" or "contractor" means a natural person who contracts on behalf of a firm, corporation, partnership, or other business entity to construct, alter, or rehabilitate a water well on lands other than his own for compensation.

(9) "Water well driller" or "driller" means any person, other than an apprentice, at a drilling site causing a water well to be drilled, altered, or rehabilitated.

37-43-103. EXEMPTIONS - repealed. Sec. 10, Ch. 728, L. 1985

37-43-104. LICENSED MONITORING WELL CONSTRUCTOR TO SUPERVISE ALL CONSTRUCTION OF MONITORING WELLS. (1) Any firm, corporation, or partnership may engage in the business of constructing or installing monitoring wells provided a licensed monitoring well constructor is in charge of all monitoring well installation.

(2) The licensed monitoring well constructor must be physically present at the site throughout the construction of the monitoring well.

[Compiler's Comment] Initial licensure as a monitoring well

constructor. (1) An applicant who submits an application for a monitoring well constructor's license before December 31, 1989, shall receive a license if the applicant:

(a) provides verification of 1 or more years' experience in installing monitoring wells within the 4 years preceding the application;

(b) pays a fee prescribed by the board of water well contractors in 37-43-303; and

(c) provides a bond in compliance with 37-43-306.

(2) A licensed water well contractor is not required to obtain a separate license to install monitoring wells, but shall meet the requirements of subsections (1)(b) and (1)(c) before being authorized to proceed with monitoring well installation.

Part 2 Board of Water Well Contractors

37-43-201. ORGANIZATION -- SEAL -- COMPENSATION OF MEMBERS.

(1) The board shall annually elect a chairman and vice-chairman.

(2) The board shall have a seal with the words engraved thereon, "Board of Water Well Contractors", and such seal shall be affixed to all writs, authentication of records, and other official proceedings of the board. The courts of this state shall take judicial notice of such seal.

(3) Each appointed member of the board who is not a government employee shall receive as compensation for his services the sum of \$50 per day for each day actually engaged in the performance of the duties of his office, including time of travel between his home and the places at which he shall perform such duties, together with mileage and per diem expenses as provided for in 2-18-501 through 2-18-503. The members who are employees of the state of Montana shall receive no extra compensation for their services as members of the board.

37-43-202. POWERS AND DUTIES. (1) The board may exercise the authority granted to it by this chapter.

(2) The board shall adopt rules and orders to effectuate this chapter.

(3) The board shall adopt rules to establish mandatory water well construction standards and enforcement procedures. The standards must address the protection of the drilling site; specifications for casing materials; materials and specifications for well screens; casing perforations; well development procedures; proper sealing and grouting; temporary capping; cleaning and disinfecting; bonds; guarantees; contractors' and drillers' qualifications; tests for yield and drawdown; reporting procedures and requirements for water quality, well logs, location of wells, and information relating to local conditions; well filters; access ports; gravel packing; sampling methods; plumbness and alignment of the hole and casing; well abandonment procedures; and other necessary and appropriate standards.

(4) The board shall adopt minimum standards regarding the construction, use, and abandonment of monitoring wells. The

standards must be designed to protect the state's ground water resource from degradation by contamination and loss of hydrostatic pressure. A violation of the standards does not occur if it can be shown that noncompliance results in equal or greater protection of the ground water resource.

(5) The board may request the department to inspect water wells or monitoring wells drilled or being drilled, and the department has access to these wells at reasonable times.

(6) The board may establish a program for training apprentices and licensed or prospective water well contractors, water well drillers, and monitoring well constructors to more effectively carry out this chapter.

(7) The board shall set and enforce standards and rules governing the licensing, registration, and conduct of water well drillers, water well contractors and monitoring well constructors.

(8) The board shall set fees commensurate with costs. The board may establish fees, including but not limited to fees for application, examination, renewal, reciprocity, late renewal, and continuing education. Board costs not related to specific programs may be equitably distributed as determined by the board. The board shall maintain records sufficient to support the fees charged for each program area.

(9) The rules of the board must be compiled in printed form for distribution to interested persons, for which the department may charge a fee. Sums realized from these sales must be deposited in the state special revenue fund for the use of the board.

(10) The board shall:

(a) authorize the department to issue licenses to qualified water well contractors, water well drillers, and monitoring well constructors in this state;

(b) cause examinations to be made of applicants for licenses;

(c) deny, revoke, or suspend licenses for good cause, after notice and opportunity to be heard;

(d) reinstate licenses previously revoked when justification is shown to the satisfaction of the board; and

(e) generally perform duties which will carry out this chapter.

(11) The board shall pay to the department its share of the assessed costs of the department in administering this chapter.

37-43-203. DISCIPLINARY AUTHORITY -- INJUNCTIONS. (1) The board may adopt rules specifying grounds for disciplinary action and rules providing for:

(a) revocation of a license;

(b) suspension of its judgment of revocation on terms and conditions determined by the board;

(c) suspension of the right to practice for a period not exceeding 1 year;

(d) placing a licensee on probation;

(e) reprimand or censure of a licensee; or

(f) taking any other action in relation to disciplining a

licensee as the board in its discretion considers proper.

(2) Any disciplinary action by the board must be conducted as a contested case hearing under the provisions of the Montana Administrative Procedure Act.

(3) The board may maintain an action to enjoin a person from engaging in the drilling, making, or construction of water wells or monitoring wells until a license to practice is procured. A person who has been enjoined and who violates the injunction is punishable for contempt of court.

Part 3 Licensing

37-43-301. LICENSED PERSON TO SUPERVISE ALL CONSTRUCTION.

(1) Any firm, corporation, or partnership may engage in the business of constructing water wells provided a licensed water well contractor is placed in charge of all water well construction.

(2) The licensed water well contractor must be the individual who contracts on behalf of the firm, corporation, or partnership.

(3) A licensed water well driller, pursuant to 37-43-305, must be employed by a licensed water well contractor.

37-43-302. LICENSE REQUIRED. (1) The drilling, making, or construction of water wells and monitoring wells is declared to be a business and activity affecting the public interest, requiring reasonable standards of competence. Except as provided in subsection (2), it is unlawful for any water well contractor, water well driller, or monitoring well constructor as defined in this chapter, to construct, alter, or rehabilitate a water well or a monitoring well without first having obtained a valid license therefor as provided for in this chapter. An individual who is licensed as a water well contractor is not required to have a separate water well driller's license to perform the actual construction work on the well or a separate license to install monitoring wells.

(2) A license is not required for:

(a) a person who drills, alters, or rehabilitates a water or monitoring well on land that is owned or leased by him, provided:

(i) the land is used by him for farming, ranching, or agricultural purposes or as his residence;

(ii) the person obtains a permit from the board; and

(iii) the construction of the well conforms to the minimum construction standards for water or monitoring wells set by board rule; or

(b) an apprentice water well driller who performs labor or services for a licensed water well contractor or driller in connection with the drilling of a water well at the direction and under the personal supervision of a licensed water well contractor or driller.

(3) (a) To obtain a permit under subsection (2)(a), a person shall file with the department an application containing the

applicant's name, mailing address, the location of the proposed well, the nature of the applicant's ownership interest in the property on which the well is to be located, the construction or installation method to be used, and the use for the proposed well.

(b) The board shall promptly issue a permit if it finds that:

(i) the well is located on land that the applicant owns or leases and that he uses for farming, ranching, or agricultural purposes or as his residence; and

(ii) the construction or installation method to be used meets the minimum standards for water wells or monitoring wells set by board rule.

37-43-303. APPLICATION -- FEE. (1) Except as provided in 37-43-302(2), a person desiring to engage in the drilling, making, construction, alteration, or rehabilitation of one or more water or monitoring wells for underground water in this state shall first file an application with the department for a license. The application must set forth the applicant's qualifications, the equipment proposed to be used in the contracting, and other matters required by the board on forms adopted by the board.

(2) The department shall charge a fee prescribed by the board for filing an application. The application shall not be acted on until the fee has been paid. Fees collected under this section shall be deposited in the state special revenue fund for the use of the board.

(3) An appropriate license shall be issued to an applicant if, in the opinion of the board, the applicant is qualified to conduct water well or monitoring well construction operations. In the granting of licenses, the board shall have due regard for the interest of this state in the protection of its underground waters.

37-43-304. TEMPORARY LICENSE PENDING EXAMINATION. -- repealed. Sec. 18, Ch. 538, L. 1987.

37-43-305. EXAMINATION AND QUALIFICATIONS. (1) Under board rules pertaining to the business of drilling and contracting for drilling of water wells and monitoring wells, the department shall inquire by examination or otherwise into the qualifications of applicants for licenses. Examinations may be oral, written, or both.

(2) The qualifications for a water well contractor's license are:

(a) familiar knowledge of groundwater laws of this state and sanitary standards for water well drilling and construction of water wells;

(b) knowledge of types of water well construction;

(c) knowledge of types of drilling tools and their uses;

(d) knowledge of geology in its relation to well construction;

(e) possession of adequate equipment by the applicant to

complete satisfactory water wells under the standards of the board;

- (f) financial responsibility of the applicant;
- (g) successful completion of an examination given by the department; and
- (h) completion of an apprenticeship of 1 year or more under the direct supervision of a licensed water well contractor or equivalent education, experience, or both, as determined by the board.

(3) The qualifications for a water well driller's license are:

(a) familiar knowledge of groundwater laws of this state and sanitary standards for water well drilling and water well construction;

- (b) knowledge of types of water well construction;
- (c) knowledge of types of drilling tools and their uses;
- (d) knowledge of geology in its relation to well construction;

(e) employment by a licensed water well contractor;

(f) completion of an apprenticeship of 1 year or more under the direct supervision of a licensed water well contractor or driller or equivalent education, experience or both, as determined by the board; and

(g) successful completion of an examination given by the department.

(4) The qualifications for a license to construct monitoring wells are:

(a) familiar knowledge of groundwater laws of this state and sanitary standards for drilling and construction of monitoring wells;

- (b) knowledge of types of monitoring well construction;
- (c) knowledge of types of drilling tools used for monitoring wells and their uses;
- (d) knowledge of geology;
- (e) financial responsibility of the applicant;
- (f) 1 or more years of experience in drilling monitoring wells under the direct supervision of a licensed monitoring well constructor or equivalent education, experience, or both, as determined by the board; and

(g) successful completion of an examination related specifically to drilling of monitoring wells given by the department.

(5) The department shall give examinations at times and places the board determines. Failure of an applicant to successfully complete the examination disqualifies him from making further application for a period of 3 months. The board shall act within a reasonable time on applications for licenses. An application shall be accompanied by the initial fee, and failure to successfully meet the requirements of the board does not entitle the applicant to a refund of the fee.

37-43-306. BOND TO BE REQUIRED. (1) The department, on issuance of a water well contractor's or monitoring well constructor's license under this chapter, shall require, before

the person commences operations in this state, a good and sufficient surety bond or its equivalent in a certificate of deposit, cashier's check, bank draft, or certified check, to be approved by the board, in the sum of \$4,000, conditioned that the licensee will comply with the rules of the board.

(2) A person who is licensed in more than one category need supply only one surety bond or its equivalent in a certificate of deposit, cashier's check, bank draft, or certified check, to be approved by the board, for \$4,000.

(3) A state or federal employee who is bonded by the state or federal government is not required to supply a bond during the course of his employment with the state or federal government. A bond is required if the person ceases government employment.

(4) In lieu of the requirements of subsections (1) through (3), a firm, corporation, or partnership having more than two licensed water well contractors or monitoring well constructors may submit one bond in the amount of \$10,000 for the entire firm, corporation, or partnership.

37-43-307. ANNUAL RENEWAL -- FEE -- REVOCATION FOR NONRENEWAL. (1) The term for licenses issued under this chapter is from July 1 of each year through the following June 30. After the payment of the initial fee under 37-43-303, a licensee shall pay, before the first day of each license year, a renewal fee as prescribed by the board.

(2) If a licensee does not apply for renewal of his license before the first day of a license year and remit to the department the renewal fee, he shall have his license suspended by the board. If the license remains suspended for a period of more than 30 days after the first day of a license year, it shall be revoked by the board. However, the department, prior to this revocation, shall notify the licensee of the board's intention to revoke at least 10 days prior to the time set for action to be taken by the board on the license, by mailing notice to the licensee at the address appearing for the licensee in the records and files of the department. A license once revoked may not be reinstated unless it appears that an injustice has occurred indicating to the board that the licensee was not guilty of negligence or laches. If a person whose license has been revoked through his own fault desires to engage in the business of water well drilling or monitoring well construction in this state or contracting therefor, he must apply under 37-43-303. Notice of suspension shall be given a licensee when the suspension occurs.

37-43-308. RECIPROCITY. If a person holding a license entitling him to drill water wells or monitoring wells in another state applies for a Montana water well contractor's, water well driller's, or monitoring well constructor's license, the board may waive the apprenticeship requirements and examination requirements if it finds that the standards and requirements of the state in which the applicant is licensed are equal to or exceed those of Montana. However, the board may require the applicant to successfully complete an examination based on Montana statutes and rules relating to the drilling of water wells or monitoring wells

in this state.

37-43-309 and 37-43-310 reserved.

37-43-311. SUSPENSION AND REVOCATION OF LICENSE - GROUNDS - PROCEDURE. (1) A license issued under this chapter may be suspended or revoked by the board in cases other than failure of a licensee to renew the license after notice and hearing:

(a) in the event the licensee has violated a condition of the bond maintained by him as a prerequisite to issuance of the license;

(b) for the practice of fraud or deceit in obtaining a license;

(c) for gross negligence;

(d) for incompetence;

(e) for conviction of a felony; or

(f) for violating the requirements of this chapter.

(2) Any person may make complaint against a licensee.

Complaints shall be in writing, signed by the complainant, and must specify the charges against the licensee. The board on its own motion or on receipt of a complaint shall hold a hearing on charges.

(3) A person bringing the complaint has the burden of proof and may, at the discretion of the board, be required to appear in person. A unanimous vote of the board is required in order to revoke or suspend a license. If a suspension is directed by the board, it may not be for a period in excess of 1 year.

37-43-312. PENALTY. Any person who shall willfully violate any lawful rule or order of the board or who shall engage in the business of drilling, making, altering, or rehabilitating water wells or monitoring wells without first having obtained a license as in this chapter required or who shall violate any provision of this chapter shall be guilty of a misdemeanor and upon conviction shall be subject to a fine of not more than \$500 or imprisonment in a county jail for a term not exceeding 6 months, or both. Any violation of this chapter shall be prosecuted by the county attorney in the county in which the violation occurred or is occurring, and the trial thereof shall be held in that county.

Part 4 Miscellaneous Provisions

37-43-401. NO ACTION OR COUNTERCLAIM TO BE MAINTAINED EXCEPT BY LICENSEE. No action or counterclaim shall be maintained by any water well contractor, water well driller, or monitoring well constructor in any court in this state with respect to any agreement, work, labor, or materials for which a license is required by this chapter or to recover the agreed price or any compensation under any such agreement or for any such work, labor, or materials for which a license is required by this chapter without alleging and proving that such water well contractor, water well driller, or monitoring well constructor had a valid license at the time of making such agreement and of

supplying such labor, work, or materials.

37-43-402. COMPLETION OF CONTRACTS BY SUCCESSOR IN INTEREST OF LICENSEE. Upon the transfer by operation of law to the successor in interest of a licensed water well contractor's or monitoring well constructor's rights under a contract or agreement for the drilling, making, or construction of a water well or monitoring well, the successor in interest to such rights shall be permitted to engage in the business of drilling, making, or construction of water wells or monitoring wells to the extent necessary to perform the obligations of said licensee under such contract or agreement, provided that such engagement in business shall be under the supervision of a licensed water well contractor or monitoring well constructor.

TITLE 36, CHAPTER 21
ADMINISTRATIVE RULES OF MONTANA

BOARD OF WATER WELL CONTRACTORS

Sub-Chapter 1
Organizational Rule

36.21.101 BOARD ORGANIZATION (1) The board of water well contractors hereby adopts and incorporates the organizational rules of the department of natural resources and conservation as listed in Chapter 1 of this title.

Sub-Chapter 2
Procedural Rules

36.21.201 PROCEDURAL RULES (1) The board of water well contractors hereby adopts and incorporates the procedural rules of the department of natural resources and conservation as listed in Chapter 2 of this title.

36.21.202 PUBLIC PARTICIPATION RULES (1) The board of water well contractors hereby adopts and incorporates by this reference the public participation rules of the department of natural resources and conservation as listed in Chapter 2 of this title.

Sub-Chapter 3 reserved.

Sub-Chapter 4
Substantive Rules

36.21.401 BOARD MEETINGS - repealed.

36.21.401A DEFINITIONS (1) "Adequate equipment," as it pertains to water well contractor applicants (section 37-43-305(1)(e), MCA), will be determined on a case by case basis, based on the information shown on the application relative to equipment.

(2) "Adequate equipment", as it pertains to applicants for Montana water well drillers licenses (section 37-43-305(1)(e), MCA), means that equipment owned, leased, or rented by the responsible water well contractor in whose employ the driller will be working.

(3) "Financial responsibility--contractor," (section 37-43-305(1)(f), MCA) means the filing of the \$4,000 bond or in lieu thereof, its equivalent in a certificate of deposit, cashier's check, bank draft or certified check approved by the board necessary to obtain a contractors license, required by section 37-43-306, MCA.

(4) "Financial responsibility--driller," (section 37-43-305(1)(f), MCA) will be satisfied by the verification of the driller's employment by a bonded, licensed water well contractor.

36.21.402 LICENSURE RESTRICTED TO NATURAL PERSONS -

NONTRANSFERABLE (1) For purposes of implementing sections 37-43-303, MCA, the word "person" shall be defined to mean an individual human being. Water well contractor's or driller's licenses shall only be issued to or renewed for a person (as above defined) upon that person's meeting the appropriate requirements for licensure. The license shall show the information required by ARM 36.21.405 and 36.21.406.

(2) Before any person (as above defined) shall be issued a water well contractor's or driller's license or shall be in the lawful possession and use of such license, he shall first have met the requirements for licensure as established by sections 37-43-303 and 305, MCA. No person shall be licensed to engage in the business of a water well contractor or driller by inheritance, purchase, transfer, or by any means other than direct licensure from the board in the manner stated above.

36.21.403 REQUIREMENTS FOR CURRENT WATER WELL CONTRACTORS

(1) For purposes of implementing the two licensure system (contractor and driller), those water well contractors who are currently licensed must notify the board office by the June 30, 1986 renewal deadline as to whether they wish to renew the license as a contractor or driller.

(2) Each firm must have a licensed and bonded water well contractor who is financially responsible for that firm and in charge of drilling operations.

36.21.404 COMPLETION OF CONTRACTS BY SUCCESSOR IN

INTEREST OF LICENSED CONTRACTOR (1) Section 37-43-402, MCA, which allows for the transfer of an existing drilling contract to a successor in interest, who need not be licensed if under the supervision of a licensed contractor, shall be construed to allow the successor only to complete contracts existing at the time of transfer. At such time as the successor transferee in interest shall enter into new contracts, he shall secure proper licensure before commencing drilling operations.

36.21.405 CONTENTS OF CONTRACTOR'S LICENSE

(1) Each water well contractor's license shall show on its face the name of the contractor, his firm name, if any, address, the license number, and the date issued.

(2) Firm name and address changes shall be submitted to the board office within ten days after the change occurs.

(3) Changes in name and address must be accompanied by the fee set out in the fee schedule.

36.21.406 CONTENTS OF DRILLERS' LICENSES

(1) Each driller's license will be issued showing the driller's name, the contractor's individual name and firm name, if any, the driller license number, and the date issued.

(2) When a change in contractor occurs, in addition to the requirements of ARM 36.21.407, a new license will be issued to the driller containing the same information as listed above. A fee will be charged for the new license.

36.21.407 CHANGE OF RESPONSIBLE CONTRACTOR (1) In the event, a driller leaves a firm, the responsible contractor shall notify the board office in writing within five days. His responsibility for the driller continues until such notification is received.

(2) The driller shall notify the board office in writing of change in responsible contractor within five days of new employment.

(3) A water well contractor shall notify the board office in writing within ten days of new hirings of any driller or apprentice.

36.21.408 DRILLER COMPLETION OF EXAMINATION (1) A driller who is not licensed in Montana must successfully complete the examination prior to performing drilling work, unless he is listed as an apprentice for a licensed water well contractor firm.

36.21.409 SUPERVISION (1) "Personal supervision" is defined to mean that a licensed water well contractor or driller shall be present at the job site when the drilling rig is in operation.

36.21.410 EXAMINATION (1) The examination is given in the board office in Helena, Montana, on any work day, Monday through Friday. The examination must be started prior to 2:00 p.m.

(2) Examinations may also be given at the department of natural resources and conservation field offices in Billings, Bozeman, Glasgow, Kalispell, Lewistown, Miles City, Havre, and Missoula. Applications must be approved by the board office prior to setting for the exam at a field office.

(3) Examinations given in field offices shall be written.

(4) A grade of 80% is necessary to pass the examination. Grading will be completed by the board or its designee.

(5) Oral examinations may be given in the Helena board office with specific board approval on a case by case basis.

(6) Applicants for licensure by reciprocity will be required to pass the examination with a score of 80%.

(7) Applicants may not use notes or reference materials for the exam.

36.21.411 BOND REQUIREMENTS (1) In addition to the bond requirements of section 37-43-306, MCA, each water well contractor's bond shall, contain on the face of the bond, the individual contractor's name, as well as the company name and mailing address. A bond is not required for a driller's license.

36.21.412 APPRENTICES (1) An apprentice is a person who performs labor or services for a licensed water well contractor and whose duties are directly related to the drilling of a water well or operation of the drill rig.

(2) A contractor shall list with the board office the names of all apprentices employed on a permanent or reasonably continuous basis, except that a contractor need not list persons

employed whose duties are not directly related to the drilling of a water well.

(3) Apprentices while employed shall be under the personal supervision, as defined in ARM 36.21.409 of this chapter, of a licensed water well contractor or driller.

(4) One year's apprenticeship as required by 37-43-305(1)(h), MCA, shall consist of 12 months of full-time employment in drilling water wells under the direct supervision of a licensed water well contractor, which experience shall have occurred during the three years immediately preceding the date of application, or suitable vocational training approved by the board.

(5) The board may, upon application and request, approve equivalent experience under a non-licensed water well contractor or driller, if the experience was in a state other than Montana and if the board is satisfied that the experience was the equivalent of working under a licensed water well contractor in Montana. The board may approve other experience as equivalent as it finds appropriate.

(6) It is necessary to provide documentation of actual experience in water well construction during the past three years. This should include the number of wells constructed, the approximate dates, and any other information that would be helpful in evaluating experience.

(7) A statement from the licensing agency for water well contractors in another state relative to the experience is also required.

36.21.413 RENEWALS (1) In addition to the renewal requirements of 37-43-307, MCA, each licensed Montana water well contractor shall attach to each drilling rig a gummed label indicating the current water well contractor's license has been purchased. The label shall be attached to the drilling rig at a point near the contractor's license number. The license year will appear on the label.

36.21.414 SUSPENSION AND REVOCATION IN CASES OF NON-RENEWAL (1) Suspension and revocation as defined in section 37-43-307, MCA and relative to the non-renewing on time, is automatic and the rules on hearings and proceedings do not apply.

36.21.415 FEE SCHEDULE

(1) Application and examination

(a) Contractors	\$250.00
(b) Drillers	200.00
(c) Monitoring well constructor	110.00

(2) Re-examination

(a) Water well contractor and driller	150.00
(b) Monitoring well constructor	50.00

(3) Renewal

(a) Contractor	125.00
(b) Driller	90.00

(4) Late renewal

(in addition to renewal fee)

55.00

will be charged for any license not renewed prior to July 10	
(5) Duplicate certificate and/or license	40.00
(6) Change in contractor name and/or address	40.00
(7) Change in responsible contractor (new driller license fee)	40.00
(8) Copies of law and rules--per page (drillers and contractors are exempt from fee)	.20

**Sub-Chapter 5
Disciplinary Actions**

36.21.501 DEFINITIONS (1) "Gross negligence" as referred to in section 37-43-311(1)(c), MCA means acting with conscious disregard of a risk of which the person is or should be aware. The risk must be of such nature and degree that disregarding it involves a gross deviation from the standard of conduct that a reasonable person would observe in the actor's situation. A "gross deviation" is one that is considerably greater than lack of ordinary care.

36.21.502 VIOLATION AND COMPLAINT PROCEDURES

(1) Whenever the board shall have reason to believe that any person to whom a license has been issued has violated the provisions of Title 37, chapter 43, MCA and/or Title 36, chapter 21, Administrative Rules of Montana, or whenever written complaint, charging the holder of a license with the violation of any provision of Title 37, chapter 43, MCA and/or Title 36, chapter 21, ARM, is filed with the board, the board shall start an investigation. When the board receives a complaint, the board shall initiate an investigation within 30 days of receipt of the complaint. If from such investigation it shall appear to the board that the licensee may not be in compliance with statute or rules, the board may initiate disciplinary action.

36.21.503 HEARING PROCEDURES (1) No action to suspend, revoke, reprimand or censure, place the licensee on probation, or take action against the contractor's bond shall be taken by the board until the licensee has been furnished with a statement of the charges against him and a notice of an opportunity for hearing. The furnishing of such notice and the charges shall be sent to the licensee at least 20 days prior to the date of hearing. The notice shall be mailed to the licensee at his last known place of residence. The licensee may be present at such hearing in person or by counsel or both to contest the charges made against him. The licensee has the right to require the presence of the complainant at any hearing. If at such hearing the charges are proved, the board may revoke, suspend, place on probation, censure or reprimand the licensee, or take action against the contractor's bond.

36.21.504 DISCIPLINARY ACTIONS (1) For purposes of implementing section 37-43-203, MCA, the board of water well contractors may initiate disciplinary action for reasons including, but not limited to the following:

- (a) misrepresentation or fraud committed as a holder of a license;
- (b) false or misleading advertising;
- (c) fraud or misrepresentation in obtaining a license or renewal;
- (d) violation of federal, state, municipal or county ordinances or regulations affecting the construction of water wells;
- (e) violation of Title 37, Chapter 43, Montana Codes Annotated and/or Title 36, Chapter 21, Administrative Rules of Montana;
- (f) demonstration of technical incompetence to carry out water well construction;
- (g) failure to file well logs with the proper authorities within the required time period as per section 85-2-516, MCA;
- (h) failure to provide the customer with an accurate copy of the well log upon completion of the well as per ARM 36.21.639;
- (i) allowing his license number to be used on a well log when the licensee was not actually involved in the construction of the well;
- (j) knowingly making false statements on a well log;
- (k) during the period of revocation or suspension, employing an individual, as a driller or contractor, whose water well contractor's or driller's license has been suspended or revoked;
- (l) failure to exercise proper supervision as required by ARM 36.21.409;
- (m) drilling of water wells by a contractor who does not have a current bond or in lieu thereof, a cashier's check, certificate of deposit, or bank draft in the correct amount, on file in the board office, as required by section 37-43-306, MCA;
- (n) performing as a contractor without a contractor's license and bond;
- (o) falsifying apprenticeship records.

(2) When, after an opportunity for hearing, the board finds that a contractor or driller has failed to comply with the requirements of statute and rules, the board may take any of the following actions:

- (a) revoke a license;
- (b) suspend its order of revocation, on terms and conditions determined by the board;
- (c) suspend the right to practice for a period not to exceed one year;
- (d) place a licensee on probation;
- (e) reprimand or censure a licensee; and
- (f) order forfeiture of a licensee's bond or its equivalent (cashier's check, certificate of deposit, bank draft or certified check).

36.21.505 FORFEITURE OF BOND OR OTHER SECURITY (1) When it appears that the proposed action may result in forfeiture of a surety bond, the board shall send notice of the proposed disciplinary action to the surety.

(2) When the board finds, after an opportunity for hearing, that a licensed contractor has violated any of the requirements of Title 37, chapter 43, MCA or of Title 36, chapter 21, ARM, the board may issue an order of forfeiture of the licensee's bond or other security. The order of forfeiture shall be in writing and shall refer to the violations upon which the order is based. Copies of the order shall be sent to the licensee and surety, if any. After issuing an order of forfeiture, the board may take any steps necessary to collect the amount of the bond or other security.

(3) In order to further the purposes of the Act as stated in 37-43-101, MCA, and in particular to promote the conservation of underground water resources and to protect the public, the board may, in its discretion, apply the forfeited bond or security to remedy defects or compensate for damages caused by the licensee's violation of the requirements of Title 37, chapter 43, MCA, or of Title 36, chapter 21, ARM.

36.21.506 LICENSURE REINSTATEMENT AFTER REVOCATION (1) A license which has been revoked may be reinstated after the period of time specified in the revocation order has elapsed provided that the licensee complies with the requirements of sections 37-43-303, 305, and 306, MCA, including successful completion of the appropriate examination.

(2) Additional training may be required at the discretion of the board.

Sub-Chapter 6 Construction Standards

36.21.601 CONSTRUCTION AND MATERIALS REQUIREMENTS AND STANDARDS - repealed.

Rules 36.21.602 - 630 reserved

36.21.631 CODE OF OCCUPATIONAL CONDUCT - repealed.

36.21.632 WELL LOGS - repealed.

36.21.633 ABANDONED WELLS - repealed

36.21.634 DEFINITIONS For purposes of this chapter, the following terms shall apply:

(1) "Abandoned water well"

(a) "permanent" means a well whose use has been permanently discontinued, or which is in such disrepair that its continued use for the purpose of obtaining ground water is impractical or may be a health hazard.

(b) "temporary" means a well from which a drilling rig has been removed from the well site prior to completing or altering

the well.

(2) "Access port" means an opening in the upper terminus of a well casing in the form of a tapped hole and plug or a capped pipe welded onto the casing to permit entry of water-level measuring devices into the well.

(3) "Annular space" ("annulus") means the space between a drill hole and a casing pipe, or between two well casings.

(4) "Aquifer" means any underground geological structure or formation which is capable of yielding water or is capable of recharge.

(5) "Artesian well" means a well in which the water level rises above the point at which it was first encountered. This term includes both flowing and non-flowing wells.

(6) "Bentonite" means a highly plastic, highly absorbent, colloidal clay composed largely of mineral montmorillonite.

(7) "Board" means the Montana board of water well contractors.

(8) "Capped well" means a well that is not in use and has a permanent seal or locked cap installed on top of the casing.

(9) "Casing"

(a) "inner" means the inner tubing, pipe, or conduit installed inside the well casing or lower well drill hole, and used to protect against caving formations or to seal out polluted or mineralized water zones.

(b) "outer" means an impervious durable pipe placed in a well to prevent the walls from caving, to seal off surface drainage or undesirable water, gas, or other fluids to prevent their entering the well, and to prevent the waste of ground water.

(10) "Casing seal" means the watertight seal established in the drill hole between the well casing and the drill hole wall to prevent the inflow and movement of surface water or shallow ground water in the well annulus, or to prevent the outflow or movement of water under artesian or hydrostatic pressures.

(11) "Clay" means a fine-grained, inorganic material having plastic properties and with a predominant grain size of less than 0.005 mm or 0.0002 inches.

(12) "Community water system" means any public water supply system which serves at least ten service connections used by year-round residents or regularly serves at least 25 year-round residents.

(13) "Concrete" means a mixture of not more than two parts sand and one part cement and not more than six gallons of clear water per 94-pound bag of portland cement. Up to five percent, by weight, of bentonite clay may be used to improve flow and reduce shrinkage.

(14) "Confining formation" means a body of impermeable or distinctly less permeable material stratigraphically adjacent to one or more aquifers.

(15) "Consolidated formation" means any geologic formation in which the earth materials have become firm and coherent through natural rock forming processes. It includes, but is not limited to, basalt, granite, sandstone, shale, conglomerate, and limestone.

(16) "Construction of water wells" means all acts necessary to obtain ground water by wells, including the contracting for and excavation of the well, installation of casing, grout, screens, and developing and testing, whether in the installation of a new well or the alteration of an existing well. The term does not include the installation of permanent pumps and pumping equipment.

(17) "Contamination" means an impairment of water quality by chemicals, radionuclides, heat, or biologic life to a degree that may or may not affect the potential or intended use of water.

(18) "Department" means the department of natural resources and conservation.

(19) "Disinfection" means the introduction of chlorine, or other disinfecting agents using a method approved by the board, in a sufficient concentration and followed by an adequate exposure contact time so as to inactivate coliform or other indicator organisms.

(20) "Drawdown" means the extent of lowering of the water level in a well when pumping is in progress or when water is discharging from a flowing well. Drawdown is the difference, measured in feet, between the static water level and the pumping level.

(21) "Gravel pack"

(a) "artificial gravel pack" means placement of gravel in the annular space around the well casing or screen. A gravel pack is frequently used to prevent the movement of finer material into the well casing, to increase the ability of the well to yield water and to lend lateral support to screens in unstable formations.

(b) "natural gravel pack" means a gravel pack which leaves the coarser naturally occurring gravels around the screen. The finer sands are removed from the formation by development.

(22) "Grout" means neat cement or heavy bentonite water slurry. Heavy bentonite water slurry when used as grout shall be of sufficient viscosity to require a time of at least 70 seconds to discharge one quart of the material through an American Petroleum Institute (API) marsh funnel viscometer. Bentonite water slurry shall weigh not less than nine pounds per gallon. It must be fresh bentonite with no additives or polymers.

(a) "bentonite clay grout" means a mixture consisting of not less than one-half pound of commercial bentonite clay to one gallon of clear water.

(b) "neat cement grout" means a mixture of not more than six gallons of clear water per 94-pound bag of portland cement. Up to 5 percent, by weight, of bentonite clay may be used to improve flow and reduce shrinkage. No sand or gravel is to be used in cement grout.

(23) "Monitoring well" means a well that will be used for the monitoring of ground water quality or flow direction but is not to be used as a means of withdrawing ground water for purposes other than water quality sampling or pump testing.

(24) "Multi-family water supply system" means a non-public water supply system designed to provide water for human consumption to serve two through nine living units. The total

people served shall not exceed 24.

(25) "Non-community water system" means any public water supply system which is not a community water system.

(26) "Pitless adapter or pitless unit" means a commercially manufactured unit or device designed for attachment to a well casing which permits buried pump discharge from the well and allows access to the interior of the well casing for installation or removal of the pump or pump appurtenances, while preventing the entrance of contaminants from surface or near surface sources from entering the well.

(27) "Pollution" means a serious impairment of water quality by chemicals, radionuclides, heat, biologic organisms, or other extraneous matter to the degree that impairs the potential or intended use of water or creates a hazard to the public health and safety.

(28) "Potable water" means water which is safe for human consumption in that it is free from impurities in amounts sufficient to cause disease or harmful physiological effects.

(29) "Public water supply system" means a system for the provision of water for human consumption from any community well, water hauler for cisterns, water bottling plant, water dispenser or other water that is designed to serve ten or more living units for at least 60 days out of the calendar year or 25 or more persons at least 60 days out of the calendar year.

(30) "Pump test" means the procedure used to determine the yield characteristics of a water well by installing and operating a pump for an extended period of time.

(31) "Pumps" and "pumping equipment" means any equipment or materials utilized or intended for use, including seals and tanks, together with fittings and controls, in withdrawing or obtaining ground water for any use.

(32) "Sand" means a detrital material having a prevalent grain size ranging from two millimeters to 0.06 millimeters or .08 inches to .002 inches.

(33) "Sanitary well seal" means a manufactured seal installed at the top of the well casing which, when installed, creates a watertight seal to prevent contaminated or polluted water from gaining access to the ground water supply.

(34) "Silt" means an unconsolidated clastic sediment composed predominantly of particles between 0.06 and 0.005 mm or .002 inches to .0002 inches in diameter.

(35) "Static water level" means the vertical distance from the surface of the ground to the water level in a well when no water is being taken from the aquifer either by pumping or by free flow.

(36) "Unconsolidated formation" means naturally occurring, non-cemented materials including, but not limited to, clay, sand, silt, and gravel.

(37) "Water table" means the upper surface of an unconfined water body, the surface of which is at atmospheric pressure and fluctuates seasonally.

(38) "Well drilling machine" means any power-driven machine used in the construction or alteration of water wells, including, but not limited to, percussion, jetting, rotary, boring, digging,

or augering machines.

(39) "Well log report" means DNRC form no. 603 to be completed and filed by a water well driller/contractor to record well information on wells constructed.

36.21.635 PUBLIC, COMMUNITY, NON-COMMUNITY PUBLIC, AND MULTI-FAMILY WATER SUPPLY WELLS (1) All wells for public, community, non-community public and multi-family water supply system use are governed by those construction standards set forth in the department of health and environmental sciences rules (Title 16, chapters 16 and 20, Administrative Rules of Montana). Copies of the rules may be obtained by contacting that department.

(2) The minimum construction standards set by the board of water well contractors in this sub-chapter (Title 36, chapter 21, sub-chapter 6) shall apply to all wells in Montana. However, for the above-stated wells, the department of health and environmental sciences may adopt more specific or stringent standards.

36.21.636 DRILLING AGREEMENT (1) A written drilling agreement should be provided to the well owner by the water well contractor prior to the construction of the well.

(2) The drilling agreement, if used, should contain, but not be limited to the following items:

- (a) name and address of the well owner and the contractor;
- (b) legal description of the property on which the well is to be drilled;
- (c) site protection;
- (d) depth at which well owner requests drilling operations cease and contract be renegotiated (in cases of lack of sufficient water);
- (e) size and type of casing to be used;
- (f) disinfection responsibility;
- (g) excessive pressures (flowing wells);
- (h) applicable warranties and guarantees;
- (i) abandonment responsibilities, if it becomes necessary to abandon the well for any reason;
- (j) itemized price list, including cost per foot of drill hole; and
- (k) date, signatures of well owner and water well contractor.

(3) Copies of all drilling agreements should be maintained by the water well contractor for a period of three years.

(4) As part of a disciplinary action, the board may require a licensee to make use of written drilling agreements.

36.21.637 PROTECTION OF SITE (1) The contractor shall remove from the site all unused materials. Water pumped from the well shall be conducted to a place where it will be possible to dispose of the water without damage to property or the creation of a nuisance.

(2) Cleanup and restoration of site shall be covered by the drilling agreement.

(3) The well shall be protected by the contractor from pollution during construction.

36.21.638 LOCATION OF WELLS (1) Water wells should not be located within:

- (a) 10 feet of property lines unless properly protected by easement or agreement;
- (b) 50 feet of septic tanks;
- (c) 100 feet of drainfields, seepage pits or cesspools, or other site treatment systems;
- (d) 10 feet of sewer lines with permanent watertight joints, or
- (e) 50 feet of other sewer lines.

(2) Contractors should contact local flood plain administrators for rules pertaining to wells in flood plain areas.

36.21.639 WELL LOG REPORTS (1) A licensed Montana water well contractor/driller shall prepare a well log report form for each well drilled. The contractor/driller shall supply a copy of the well log report to the water well owner and such agencies as required by section 85-2-516 and 85-2-517, MCA, and maintain a copy as a record in his files.

36.21.640 WELL CASING (1) All casing installed, other than plastic casing set forth in ARM 36.21.641 and 36.21.645, shall be of steel, in new or like new condition, being free of pits, breaks, or contamination, and shall meet minimum American Society of Testing Materials (ASTM A-120) specifications for line pipe, for the following sizes:

(Minimum specifications for steel well casing)

Nominal Size (inches)	Outside Diameter (inches)	Wall Thickness (inches)	Weight Per Foot (pounds)
2	2.375	.154	3.56
2	2.875	.203	5.79
3	3.500	.216	7.58
3	4.000	.226	9.11
4	4.500	.237	10.79
5	5.563	.244	13.70
6	6.625	.250	17.02
8	8.625	.250	22.36
10	10.750	.250	28.04
12	12.750	.312	41.45
14	14.000	.312	45.68
16	16.000	.312	52.27
18	18.000	.375	70.59
20	20.000	.375	78.60

(2) All casing having a diameter larger than 20 inches shall have a wall thickness of at least .375 inch.

(3) Well casing installed in a well greater than a nominal diameter of 10 inches, may have a wall thickness of .250 inch as long as it otherwise meets ASTM A-120 specifications and does not exceed the following depth limitations:

<u>Diameter</u>	<u>Maximum Depth</u>
12 inches	250 feet
14-16 inches	150 feet
18-20 inches	100 feet

(4) Casings of other specifications may be considered under the provisions of variances ARM 36.21.680.

36.21.641 INNER CASING (1) Inner casing installed through caving formations, or for sealing out water of poor quality, and installed without driving, may be of lighter weight than specified by the table under ARM 36.21.640. Such lightweight pipe shall have a wall thickness equal to or greater than a minimum wall thickness of .188 inch. All inner casing shall be of steel, in new or like new condition, being free of pits or breaks; or shall be of polymerized vinyl chloride conforming with American Society for Testing and Materials Specification F480-81 per ARM 36.21.645. Inner casing installed in a well shall extend or telescope at least 4 feet into the lower end of the well casing. In the event that more than one string of inner casing is installed, each string shall extend or telescope at least 4 feet into the adjacent larger diameter inner casing.

(2) In the event inner casing must be driven, it must meet the specifications of ARM 36.21.640.

36.21.642 STEEL CASING JOINTS (1) All casing joints shall be welded or screw coupled and shall be watertight. If welded casing joints are used, the weld shall be a full penetrating weld at least equal in thickness to the wall thickness of the casing. Welded casing joints shall have a tensile strength equal to or greater than that of the casing.

36.21.643 TEMPORARY CASING (1) Temporary outer surface casing used in the construction of a well shall be withdrawn as sealing material is placed.

36.21.644 CASING SHOE (1) In all drilled wells, permanent well casing that is driven should be equipped with a standard drive shoe at its lower end, welded or threaded onto the lower end of the string of casing. The shoe shall have a beveled cutting edge of metal forged, cast, or fabricated for this special purpose.

36.21.645 PLASTIC CASING (1) All plastic casing shall be installed only in an oversized drill hole without driving. Wells cased with plastic shall have steel casing extending a minimum of 18 feet below the surface and 18 inches above the ground surface. Methods of installation shall be:

(a) by installing a larger size steel casing on the outside of the plastic casing with a minimum of 8 feet of overlap (Figure 6-A); or

(b) by attaching directly to the plastic casing a threaded plastic to steel coupling (Figure 6-B).

(2) Thermoplastic well casing shall conform with American Society for Testing and Materials Specification F480-81 or latest revision as follows:

(a) minimum standards dimension ratio shall be twenty-six for inner casing in bedrock applications;

(b) minimum standards dimension ratio shall be twenty-one for unconsolidated formations greater than 125 feet;

(c) minimum pipe stiffness shall be two hundred twenty-four foot-pounds/in² [kiloneutron (meter · meter)] when tested according to section 5.4.1 of American Society for Testing and Materials Specification F480;

(d) all casing five inches [12.7 centimeters] and larger shall be tested for impact resistance and meet or exceed IC-1 impact classification according to section 6.5 and table 6 of American Society for Testing and Materials Specification F480;

(e) carry the seal of the National Sanitation Foundation.

(3) All casing shall have additional thickness and weight if standard thickness is not capable of withstanding forces to which it is subject.

(4) The well casing must be clearly marked by the manufacturer showing: nominal size, type plastic material, Standard Dimension Ratio (SDR), ASTM designation, and National Sanitation Foundation seal of certified approval.

(5) The use of plastic well casing in connection with a pitless adaptor is not acceptable.

36.21.646 PLASTIC CASING JOINTS (1) All casing joints shall be watertight. Either "bell" type or coupling hubs or threaded couplings are approved. Hub couplings shall be of material meeting the specifications for plastic casings as stipulated in ARM 36.21.645. Solvent cemented joints shall be made in accordance with manufacturer's directions.

36.21.647 TOP TERMINAL HEIGHT (1) The casing head or pitless unit of any water well shall extend not less than 18 inches above the finished ground surface or pump house floor, and not less than 18 inches above the local surface runoff level. No casing shall be cut off below land surface except to install a basement offset or a pitless unit, or during permanent abandonment of a well. The ground surface immediately surrounding the top of the well casing or pitless unit shall be graded so as to drain surface water away from the well. The watertight casing of any water well shall extend not less than 3 feet above the regional flood level of record.

36.21.648 CASING OPENINGS (1) There shall be no opening in the casing wall between the top of the casing and the bottom of the required casing seal except for pitless adapters, screened vents (inverted u-construction), measurement access ports, and

grout nipples installed in conformance with these standards.

(a) All pitless adaptors must be installed according to manufacturers specifications.

(2) In no case shall holes be cut in the casing wall for the purpose of lifting or lowering casing into the well bore, unless such holes are properly welded closed and watertight prior to placement into the well bore.

36.21.649 CASING CENTRALIZERS (1) Well casing to be sealed into an oversize drill hole should be equipped with centering guides to ensure the proper centering of a casing. In all events, casings shall be centered in the sealed interval. Guides should be of steel, at least 1/4 inch in thickness, evenly spaced in groups of 3 or 4 in 20 foot intervals or less. (See Figure 1.)

36.21.650 CASING PERFORATIONS (1) Perforations above the lowest expected static water level shall not be permitted. Wells may be completed with perforations as follows:

(a) in-place perforations with star, mills knife, similar type perforators, millslotted, sawed, or drilled;

(b) perforated inner casing, either torch-cut, millslotted or punched. Such inner casing may be of steel, plastic or other suitable corrosion-resistant material, but if other than steel, a full evaluation of the structural stability of the inner casing must be made prior to its placement. They may be used in a natural development or gravel packed type of construction. Where appropriate, the top of the inner casing shall be fitted with suitable packers or grout sealed to the well casing.

(2) Casing perforations that allow the well casing to act as a conduit for deleterious interflow between aquifers shall not be permitted. (That is, where waters of difference heads, different temperatures, and different quality.)

(3) Dual completions of unconsolidated and bedrock aquifers shall be permitted only with prior board approval.

(4) Perforations shall not be placed to allow cascading water within the well casing during static conditions.

(5) Perforations shall not be placed to allow upward artesian flow from one aquifer to another.

36.21.651 MOVEMENT OF CASING AFTER GROUTING (1) In no case shall the permanent well casing be moved or driven following the placement and initial set of the cement grout.

36.21.652 WELL SCREENS (1) Well screens shall be constructed of one type of corrosion-resistant material.

(a) The choice of material should be selected on the basis of chemical analysis of the water or prior knowledge of the water quality.

(2) The well screen aperture openings, screen length and diameter should be selected to have sufficient open area to transmit the desired yield, at aperture entrance velocities of 0.1 feet per second or less.

(3) Where appropriate, suitable neoprene packers or cement

grout shall be fitted to the top of the well screen assembly.

36.21.653 WELL DEVELOPMENT PROCEDURES (1) Upon completion of the well and before conducting the yield and drawdown tests, the contractor shall surge and develop the well to remove all fines, drill cuttings, mud, drilling fluids, and additives. The method of developing and length of time of development shall be determined by the contractor and well owner dependent on the type of water bearing formation encountered.

(2) The development work shall be started slowly and gently and increased in vigor as the well is developed.

36.21.654 SEALING OF CASING - GENERAL (1) In constructing, developing, redeveloping or conditioning a well, care shall be taken to preserve the natural barriers to ground-water movement between aquifers and to seal aquifers or strata penetrated during drilling operations which might impair water quality or result in cascading water. All sealing shall be permanent and prevent possible downward movement of surface waters in the annular space around the well casing. Sealing shall be accomplished to prevent the upward movement of artesian waters within the annular space around the well casing that could result in the waste of ground water. The sealing shall restrict the movement of ground water either upward or downward from zones that have been cased out of the well because of poor quality. When cement grout is used in sealing, it shall be set in place 72 hours before additional drilling takes place, unless special additives are mixed with the grout that will cause it to adequately set in a shorter period of time. All grouting shall be performed by adding the mixture from the bottom of the space to be grouted toward the surface in one continuous operation. The minimum grout thickness shall be 3 inches.

(a) three inches of grout shall mean 1 1/2 inches of grout around the outside of the casing on all sides.

(2) When casing diameter is reduced, a minimum of 4 feet of overlap shall be required and the bottom of the annular space between the casings shall be sealed with a suitable packer; the remainder of the annular space will be pressure grouted with bentonite or neat cement.

(3) All new wells shall be sealed to a minimum depth of 18 feet with grout with the exception of those wells addressed in subsection (4) of this rule.

(4) For wells drilled with a cable tool or other driven methods through unconsolidated formations, when the drilling and driving is a continuous operation, bentonite shall be fed continuously along the outside of the casing as the well is being driven. However, it is required that fresh, clean, pure bentonite be used.

36.21.655 DESIGN AND CONSTRUCTION - SEALING OF CONSOLIDATED FORMATIONS In drilled wells that penetrate an aquifer either within or overlain by a consolidated formation, sealing of the casing shall conform with one of the following procedures:

(1) An upper drill hole at least 4 inches greater in

diameter than the nominal size of the permanent well casing shall extend from land surface to at least 5 feet into sound, uncreviced, consolidated rock, but in no instance shall said upper drill hole extend less than 18 feet below land surface.

(a) Unperforated permanent casing shall be installed to extend to this same depth and the lower part of the casing shall be sealed into the rock formation with cement grout. The remainder of the annular space to land surface shall be filled with cement grout or bentonite clay grout (see Figure 2A at the end of this chapter).

(b) If cement grout is placed by pumping to seal the entire annulus from the bottom up to land surface, the upper drill hole need only be a minimum of 3 inches larger than the outside diameter of the permanent casing.

(2) An upper drill hole at least 4 inches greater in diameter than the nominal size of the permanent casing shall extend from land surface to a depth of at least 18 feet. An unperforated permanent casing shall be installed so that it extends at least 5 feet into sound, uncreviced, rock formation.

(a) Throughout the driving of the well casing to the rock formation, the annular space between the upper drill hole and the permanent casing shall be kept at least one half full with bentonite slurry.

(b) The annular space between the rock formation and the permanent casing shall be tightly sealed with cement grout. The remainder of the annular space to land surface shall then be filled with cement grout or bentonite clay grout (see figure 2B at the end of this chapter).

(3) If temporary surface casing is used in either of the above procedures (1) or (2), this casing shall be of sufficient diameter to conform to the upper drill hole specifications. Withdrawal of the temporary casing shall take place simultaneously with proper sealing of the annular space to land surface.

36.21.656 SEALING OF UNCONSOLIDATED FORMATIONS WITHOUT SIGNIFICANT CLAY BEDS (1) In drilled wells that penetrate an aquifer overlain by unconsolidated formations such as sand and gravel without significant clay beds, an unperforated well casing shall extend to at least 1 foot below the known seasonal low water table. An upper drill hole having a diameter at least 3 inches greater than the nominal size of the permanent casing shall extend to at least 18 feet below land surface.

(2) The annular space between the upper drill hole and the well casing shall be kept at least one-half full with bentonite slurry throughout the driving of the permanent casing into the aquifer. After the permanent casing is set in its final position, the remaining annular space shall be filled to land surface with cement grout or bentonite clay grout (see figure 3A at the end of this chapter).

(3) If the oversized drill hole is extended to the same depth as the permanent casing, a suitable bridge shall be installed between the casing and the drill hole at a position directly above the production aquifer. The remaining annular

space shall be completely filled and sealed to land surface with cement grout or bentonite clay grout (see figure 3B at the end of this chapter).

(a) A suitable bridge is one that prevents grout from dropping into the producing formations and reducing the output of the well.

(4) If temporary casing is used to maintain the oversized drill hole, the annular space shall be kept full with cement grout or bentonite clay grout as the temporary casing is being withdrawn.

(5) For drilling with cable tool rigs, see ARM 36.21.654.

36.21.657 SEALING OF UNCONSOLIDATED FORMATIONS WITH CLAY BEDS (1) In drilled wells that penetrate an aquifer overlain by clay or other unconsolidated deposits such as sand and gravel in which significant (at least 6 feet thick) interbeds of clay are present, the well casing may be terminated in such clay strata, provided that the casing be sealed in substantially the same manner as is required in the case of consolidated formations (see ARM 36.21.655 and figure 3C at the end of this chapter).

36.21.658 SPECIAL SEALING STANDARDS FOR ARTESIAN WELLS

(1) When artesian water is encountered in the well, an unperforated well casing shall extend into the confining stratum overlying the artesian zone. The casing shall be adequately sealed into the confining stratum so as to prevent surface and subsurface leakage from the artesian zone.

(2) If the well flows at land surface, it shall be equipped with a control valve so that the flow can be completely stopped.

(3) The well shall be completed with seals, packers, and neat cement grout that will eliminate leakage around the well casing.

(4) The driller shall not move his drilling rig from the well site until the leakage has been completely stopped unless authority for temporary removal is granted by the board.

36.21.659 SEALING OF ARTIFICIAL GRAVEL PACKED WELLS, PERMANENT SURFACE CASING NOT INSTALLED (1) An upper drill hole having a diameter of at least 4 inches greater than the outside diameter of the production casing shall be drilled to extend from land surface into a clay or other formation of low permeability overlying the water-bearing zone. The annular space to this depth shall be filled with cement grout or bentonite clay grout. If the clay or other impermeable formation is at or near land surface, the upper drill hole and unperforated production casing shall extend to a minimum depth of 18 feet below land surface, provided that the casing does not pass through the impermeable zone. A suitable bridge shall be installed in the annular space between the gravel pack and cement grout seal. A gravel fill pipe may be installed for injecting gravel prior to sealing the top of the gravel pack (see ARM 36.21.656(3)(a) for definition of a suitable bridge). Special care shall be taken to insure that the seal is watertight around the injection pipe. The injection pipe shall be capped with a watertight seal or plug (see figure 4A at

the end of this chapter).

36.21.660 SEALING OF ARTIFICIAL GRAVEL PACKED WELLS, PERMANENT SURFACE CASING INSTALLED (1) When permanent surface casing is installed, the well bore shall have a diameter of at least 4 inches greater than the surface casing for the introduction of sealing materials. A watertight seal shall be installed at the top of the gravel pack between the permanent surface and production casing. Sealing procedures and installation of gravel fill pipes are substantially the same as in ARM 36.21.659 above. If a temporary casing is used to maintain the oversized drill hole, the annular space to be sealed under conditions of ARM 36.21.659 and 36.21.660 shall be kept full with cement grout or bentonite clay grout as the temporary casing is withdrawn (see figure 4B at the end of this chapter).

(2) If a clay layer or other formation of low permeability is not encountered before reaching the top of the water-bearing zone, the upper drill hole and unperforated production casing shall extend to a minimum depth of 18 feet below land surface. Sealing procedures, installation of gravel fill pipes and temporary casing are substantially the same as in ARM 36.21.659 and 36.21.660.

36.21.661 TEMPORARY CAPPING (1) At all times during the progress of the work, the contractor shall protect the well in such a manner as to effectively prevent either tampering with the well or the entrance of foreign matter into it. Upon its completion, he shall provide and set a substantial screwed, flanged or welded cap.

(2) Any well to be temporarily removed from service, temporarily abandoned due to a recess in construction, or any well to be temporarily abandoned before commencing service, shall be capped with a watertight seal, watertight welded steel cap, or threaded cap. In all cases, caps shall be of steel or cast iron of at least three-sixteenths of an inch in thickness.

(3) Temporarily abandoned wells shall have an access port as per ARM 36.21.665.

36.21.662 DISINFECTION (1) Sand and gravel used in filter pack wells shall be thoroughly hosed or sluiced with water, and shall be disinfected with a solution containing at least 50 parts per million chlorine before being placed in the well. All water introduced into a well during construction shall be clean and potable. The well and its equipment, including the interior of the well casing, shall be thoroughly swabbed and cleaned to remove all oil, grease, and foreign substances upon completion of the well's construction. Following the completion of a well, and again after the pumping equipment has been installed, a well and its equipment shall be disinfected by thoroughly agitating and mixing in the well a solution containing enough chlorine to leave a residual of 25 parts per million throughout the well after a period of 24 hours.

(2) The responsibility for the chlorination of the well

shall be agreed upon in writing by the parties to the drilling agreement.

36.21.663 WARRANTY AND GUARANTEES (1) The contractor warrants and guarantees to the well owner that all materials and equipment shall be new unless otherwise specified and that all work shall be of good quality and free from faults or defects and in accordance with the requirements of the drilling agreement and of any inspections, tests or approvals referred to in the drilling agreement. These warranties and guarantees are void if the well owner does not give timely notice to the contractor of all unsatisfactory work, all faulty or defective work and all work not conforming to the requirements of the drilling agreement or such inspections, tests or approvals.

(2) The contractor shall extend to the purchaser, factory guarantees on pumps and accessories sold and installed by him.

(3) The warranty or guarantee period shall be a minimum of one year from the date of completion of the well.

36.21.664 TESTS FOR YIELD AND DRAWDOWN (1) Every well shall be tested for yield and drawdown for a period of not less than one hour either by bailing, pumping, or air testing. During testing, discharge rate shall be as uniform as possible.

(a) For individual wells in subdivisions, public community, non-community public and multi-family water supply wells, the testing requirements set out in the department of health and environmental sciences rules shall apply (Title 16, chapter 16 and 20, Administrative Rules of Montana). Copies may be obtained by contacting that department.

(2) Test data to be recorded on the well log report form shall be:

(a) static water level immediately before testing begins;
(b) depth at which pump is set for test;
(c) the pumping rate and means of discharge (i.e., bailing, airlift, pumping);
(d) the maximum drawdown during the test;
(e) the duration of the test, including both
(i) the pumping time and
(ii) recovery time;
(f) recovery water levels and the respective times after cessation of pumping that the recovery water level data was taken.

(g) All depth measurements shall be from the top of the well casing unless otherwise specified.

(3) Flowing wells must be flow tested at least one hour.

(4) Wells intended to yield 100 gpm or more shall be tested for a period of 8 hours or more. The test shall follow development of the well, and shall be conducted continuously at a constant discharge which is at least as great as the intended appropriation. As a minimum, water level data shall be collected and recorded on the schedule shown on the department's "well test data sheet". If possible, it is recommended that drawdown data instead be collected on a logarithmic schedule (see, for instance, Johnson's "Ground Water and Wells") throughout the

test. The height above ground of the point from which water levels are measured shall also be recorded. The above information and any additional aquifer testing data shall be attached to the driller's log and submitted to the department.

36.21.665 ACCESS PORT (1) All wells shall be equipped with an access port 1/2 inch minimum that will allow for the unobstructed measurement of the depth to water surface or a pressure gauge that will indicate the shut-in pressure of a flowing well (see figure 5 at the end of this chapter). The access ports and pressure gauges or other openings in the cover shall be sealed or capped to prevent entrance of surface water or foreign material into the well.

(2) Removable caps are acceptable as access ports.

36.21.666 ARTIFICIAL GRAVEL PACKED WELLS - GENERAL

(1) In gravel packed wells, the gravel mixture shall be placed around the screen so that bridging or size separation will not occur. The gravel pack shall be clean, chemically stable, and composed of reasonably uniform grains. All gravel and water used shall be disinfected in at least 50 ppm chlorine.

(2) Gravel packing shall be placed from the bottom of the screen upwards to 2 to 3 feet above the screen.

36.21.667 SAMPLING OF FORMATIONS (1) The contractor shall secure representative samples of all materials encountered in the formations drilled in the well. These samples shall be taken as required by the following:

(a) one sample at the beginning of each change in material encountered; and

(b) samples should be taken in the water-bearing aquifer(s).

(2) Sampling methods used shall assure securing the required representative sample. Care shall be taken to accurately determine the depth of the material sampled.

(3) Materials encountered during the sampling shall be so indicated on the well log report form.

36.21.668 WATER SAMPLES (1) To determine the chemical quality of ground water which will be available from each well and its suitability for intended uses, the water in all wells should be sampled during or immediately following construction and development.

(a) The sample shall be clearly marked with the location of the well, the date and time taken, and the depth of the strata from which the water was taken.

(2) To determine the bacteriological quality of a water supply, the water in all wells should be sampled after construction is complete and the system has been disinfected.

(a) The sample shall be collected after chlorinating solution has been dissipated or been flushed from the system.

(3) The contractor/driller should inform the well owner of the importance of having the water analyzed and coliform tests performed.

(4) Local health offices and the department of health and environmental sciences can be contacted for lists of certified labs who can perform these tests.

36.21.669 PLUMBNESS AND ALIGNMENT TEST (1) The completed well shall be sufficiently plumb and straight so that there will be no interference with installation, alignment, operation or future removal of the permanent pump.

36.21.670 PERMANENT ABANDONMENT (1) Any well that is to be permanently abandoned shall be completely filled in such a manner that vertical movement of water within the well bore, including vertical movement of water within the annular space surrounding the well casing, is effectively and permanently prohibited. All fluids within a well are to be permanently confined to the specific strata in which they were originally encountered.

(2) Abandoned wells must be completely filled with concrete or grout to within the last 3 feet of the surface. The last 3 feet shall be filled in with naturally occurring soils.

(3) In no instance shall abandoned wells be used for disposal of sewage, household waters or other contaminated material.

(4) Land surface shall be restored to a like condition, safe to livestock and humans.

36.21.671 ABANDONMENT OF FLOWING WELLS (1) The flow of flowing wells to be abandoned shall be confined or restricted by cement grout applied under pressure, or by the use of a suitable well packer, or a wooden or cast plug placed at the bottom of the confining formation immediately above the flowing water-bearing zone. Cement grout or concrete shall be used to effectively fill the well to land surface.

(2) Flowing wells should be made static before plugging with cement if they are not contained by casing. If unable to make the well static with heavy mud, heavy weight cement should be pumped into the hole from the bottom up at a brisk rate. Cement mix should be at least twice the volume needed to plug the well. The first cement pumped out will be diluted and should be discarded.

(3) If the flowing well is controlled by the casing, a pressure reading should be taken and sufficient cement should be pumped in the casing from the top so that the cement will enter the aquifer.

36.21.672 ABANDONMENT OF FILTER PACK WELLS

(1) Appropriate methods of abandonment of filter pack or gravel enveloped wells, or other wells in which coarse material has been added around the inner casing should be determined individually by the responsible water well contractor. Approval should be obtained from the board prior to abandonment.

36.21.673 REMOVAL OF WELL CASING DURING ABANDONMENT

(1) If the casing of a well is removed during abandonment, the well shall be plugged and sealed in accordance with ARM 36.21.670 and shall be filled with sealing materials as the casing is removed.

36.21.674 OBSTRUCTIONS (1) All obstructions or debris which may interfere with effective sealing operations shall be removed from the well to be abandoned.

36.21.675 CEMENT GROUT (1) Cement grout for use in abandonment operations shall conform to the requirements of ARM 36.21.634 (22)(b).

36.21.676 CONCRETE (1) Concrete for use in abandonment operations shall conform to the requirements of ARM 36.21.634 (13).

36.21.677 METHOD OF PLACEMENT OF CONCRETE OR CEMENT GROUT

(1) Concrete or cement grout used as a sealing material in abandonment operations shall be introduced at the bottom of the well or required sealing interval and placed progressively to 3 feet from the top of the well. The upper 3 feet shall be restored to its natural state. All such sealing materials shall be placed by the use of a grout pipe, tremie, or by dump bailer in order to avoid segregation or dilution of the sealing materials.

36.21.678 WATER WELL LOG REPORT (1) A water well log report, fully describing all abandonment procedures, shall be submitted to the department of natural resources and conservation.

36.21.679 DRY OR INADEQUATE WELL HOLES (1) Water wells which have been constructed and do not provide an adequate supply of water for the use for which they were drilled (dry hole) are not to be considered completed until the well driller either:

(a) removes the casing and fills the hole with cement grout, concrete, or bentonite clay grout, or
(b) constructs the well in accordance with minimum well construction standards and welds a 1/4-inch thick steel plate fully covering the top of the casing providing a watertight seal.

(2) A water well log report must be completed and filed with each dry hole, within 60 days after moving the drilling equipment from the drill site.

36.21.680 VARIANCES (1) When, due to special circumstances beyond the control of the contractor, compliance with these minimum construction standards is impossible or otherwise unreasonably difficult, a variance may be requested from the board of water well contractors prior to beginning or continuing construction of the well. The request for a variance shall be in writing and shall include:

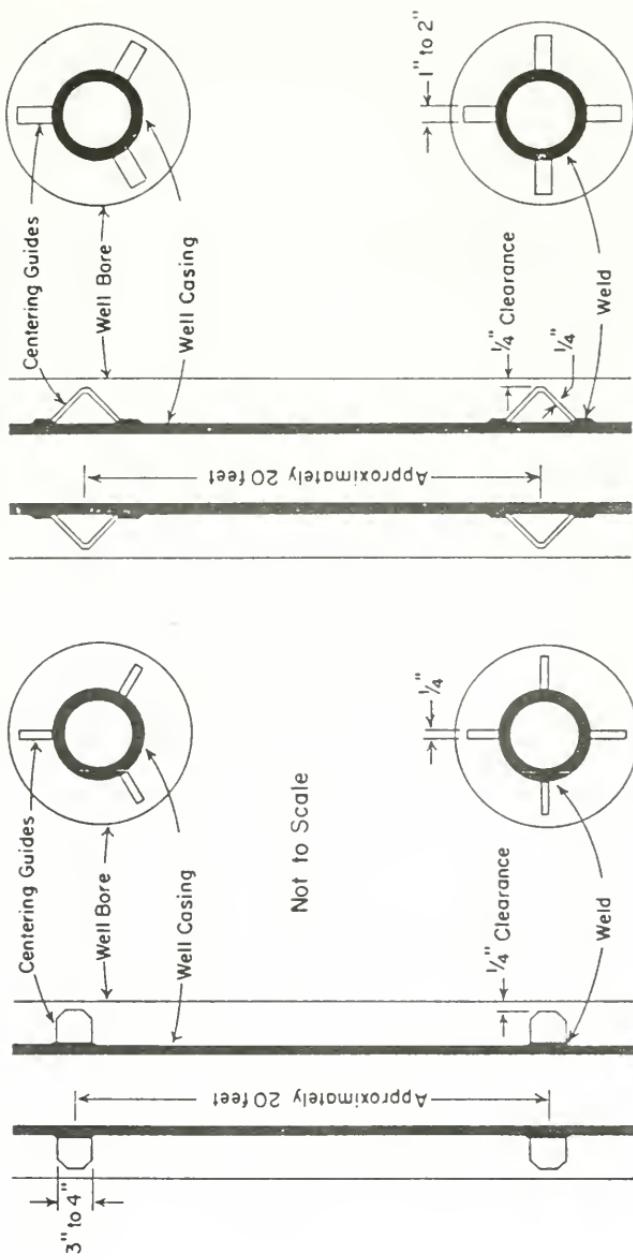
(a) the purpose of the well construction;

- (b) the location of the well;
- (c) name and address of the owner;
- (d) distance to the nearest well, septic tank, drainfield, or other hazardous wastes--surface or subsurface;
- (e) the unusual conditions existing at the well site;
- (f) the reasons that compliance with the rules for minimum standards will not result in a satisfactory well;
- (g) the proposed standards that the water well contractor believes will be adequate for his particular well; and
- (h) a drawing with written explanation showing the pertinent features of the proposed well design and construction.

(2) If the board finds that special circumstances beyond the control of the contractor make compliance with existing standards impossible or otherwise unreasonably difficult, and finds that the proposed variance will adequately protect the public and the ground water resources, the board may approve the proposed construction by prescribing a variance for the particular well under consideration.

(3) The board shall act in writing on any requests for variances within 30 days after receipt of the request.

CENTERING GUIDES



NOTE: Well casing, to be sealed into an oversize drillhole, should be equipped with a series of centering guides to insure proper centering of casing. Guides should be constructed of steel, at least $\frac{1}{4}$ " in thickness, evenly spaced in groups of 3 or 4, and welded to the casing.

Figure 1.

SEALING OF CONSOLIDATED FORMATIONS

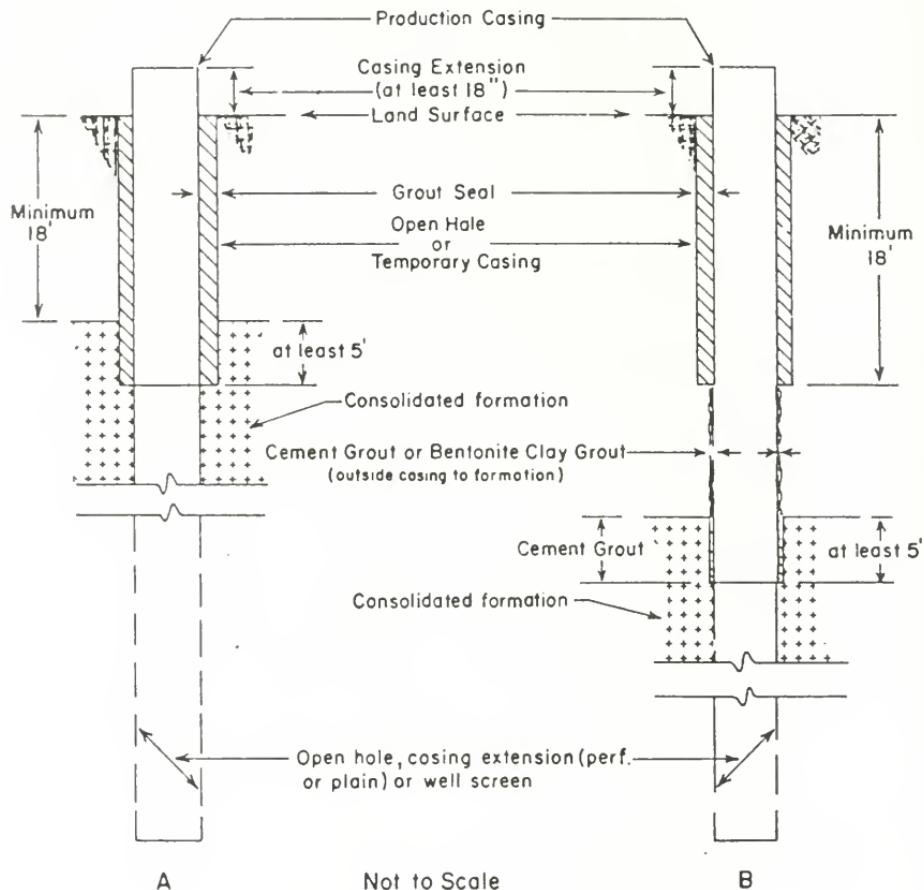


Figure 2.

CEMENT GROUT PLACEMENT

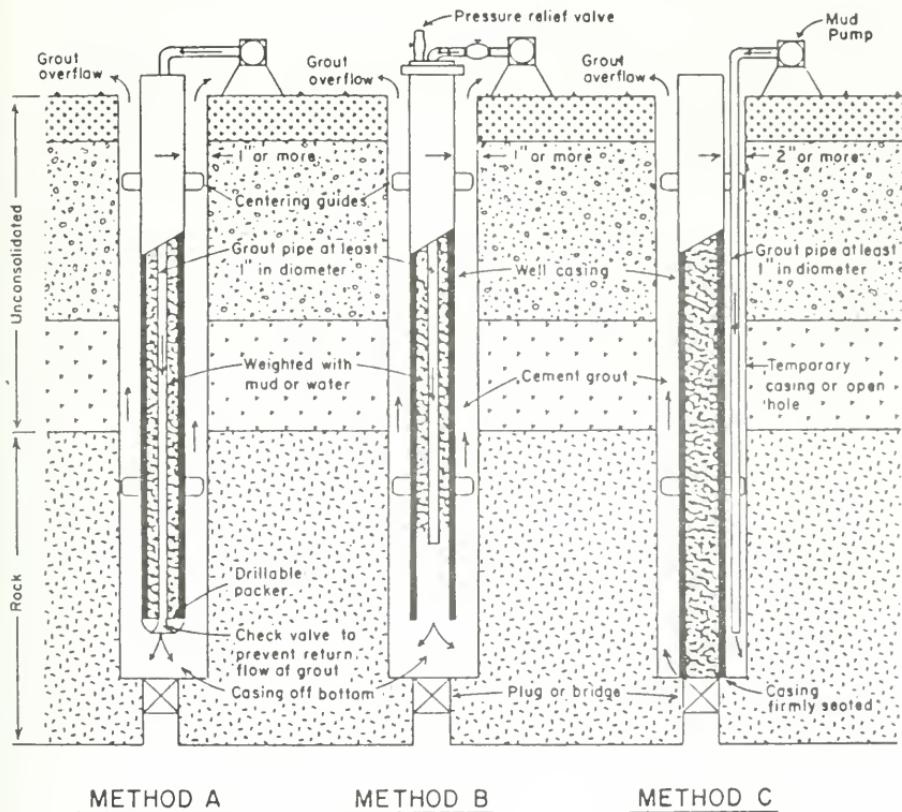
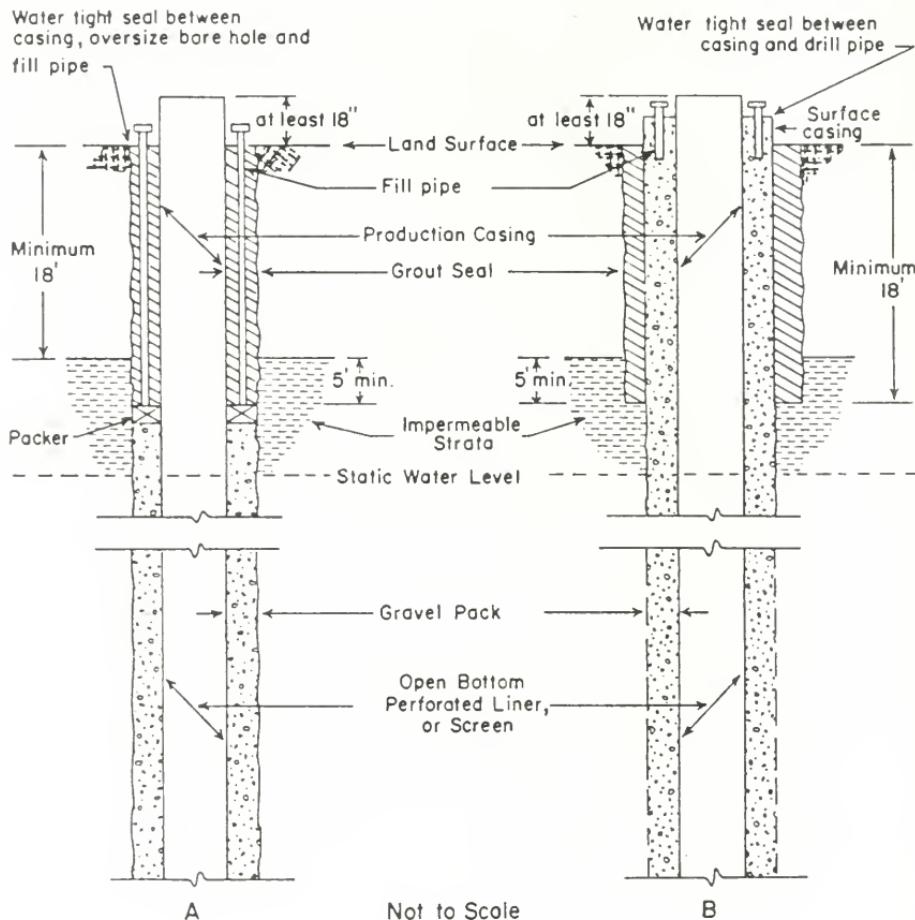


Figure 3.

SEALING OF GRAVEL-PACKED WELLS

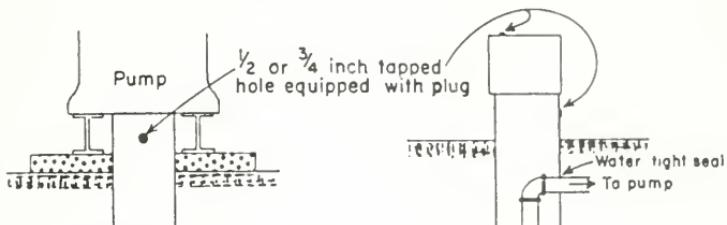


A - Well constructed without surface casing.

B - Well constructed with surface casing.

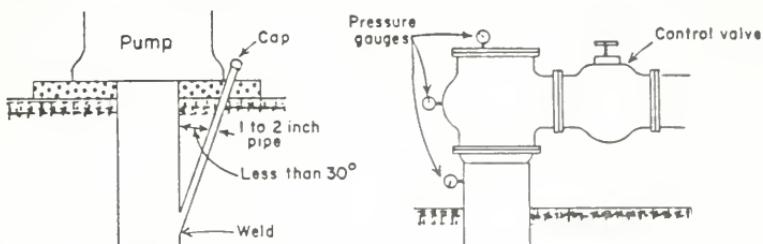
Figure 4.

SUGGESTED METHODS OF INSTALLING ACCESS PORTS, PRESSURE GAUGES, AND AIR LINES FOR MEASURING WATER LEVELS IN WELLS



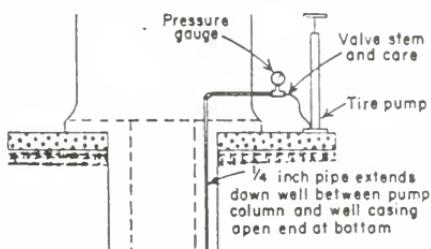
ACCESS PORT FOR MEASURING DEVICE

ACCESS PORT FOR MEASURING DEVICE



ACCESS PORT FOR MEASURING DEVICE

POSSIBLE LOCATION FOR PRESSURE
GAUGES ON AN ARTESIAN WELL

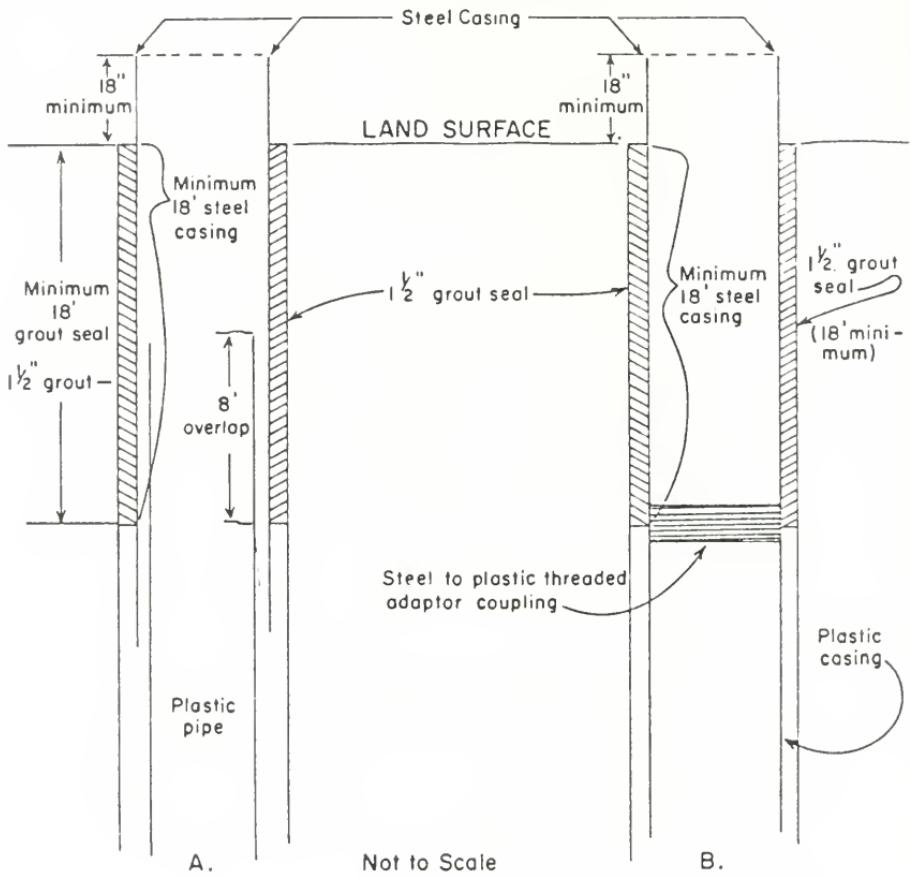


AIR LINE INSTALLATION

An air line installation is recommended where the water level lies at a considerable depth below land surface. The amount of air pressure that can be built up inside the air line will be equal to the depth of water standing above the bottom of the air line. The exact depth to the bottom of the air line is required to obtain an accurate measurement of the water level in the well. One pound per square inch pressure equals 2.31 feet of water.

Figure 5.

STEEL TO PLASTIC TRANSITION CONNECTIONS REQUIRED WITH USE OF PLASTIC



- Weil cased with plastic showing 8 foot overlap between steel and plastic.
- Well cased with plastic using steel to plastic threaded adaptor coupling.

Figure 6.

Sub-Chapter 7
Monitoring Well Constructors Licenses

36.21.701 VERIFICATION OF EXPERIENCE (1) Section 16, chapter 538, Laws of 1987, provided for initial licensure as a monitoring well constructor. Prior to May 31, 1988, verification of one year of experience in the past 4 years shall consist of:

- (a) a listing of monitoring well work performed in the past 4 years including:
 - (i) location of job site and name and address of company for whom the monitoring work was performed,
 - (ii) description of the work,
 - (iii) length of work,
 - (iv) other details which will assist in verifying the work;
- (b) three professional references other than persons within the firm by whom you are employed.

36.21.702 APPLICATION APPROVAL AND EXAMINATION

(1) Applications accompanied by proper verification and fees will be reviewed at regularly scheduled meetings of the board of water well contractors.

(2) After approval by the board, applicants may take the examinations at the board office in Helena or the department of natural resources and conservation water rights bureau field offices in Billings, Bozeman, Glasgow, Havre, Kalispell, Lewistown, Miles City, or Missoula.

(3) A grade of 80% is necessary to pass the examination. Grading will be completed by the National Water Well Association.

(4) Any applicant who has failed the monitoring well contractor examination and wishes to retake the exam will be required to pay the re-examination fee prescribed in ARM 36.21.415.

36.21.703 CONTENTS OF LICENSE (1) Each monitoring well constructor's license shall show on its face the name of the constructor, his firm name and address, the license number, and the date issued.

(2) Firm name and address changes shall be submitted to the board office within ten (10) days after the change occurs.

(3) Changes in name and address must be accompanied by the fee prescribed in ARM 26.21.415.

Sub-Chapter 8
Monitoring Well Construction Standards

36.21.801 DEFINITIONS The following definitions shall apply for monitoring well construction:

(1) "Abandoned well" means a well whose use has been permanently discontinued, or which is in such disrepair that its continued use for the purpose of monitoring groundwater is impractical. Wells which have not been monitored for more than three years shall be deemed abandoned unless written permission

is obtained from the board to maintain the well. A properly abandoned well will not produce water nor serve as a channel for movement of water.

(2) "Annular space" means the space between two concentric tubes or casings, or between the casing and the borehole wall.

(3) "Aquitifer" means any underground geological structure or formation which is capable of transmitting water in usable amounts.

(4) "Artesian" means a condition in an aquifer wherein groundwater is confined under pressure by an overlying geologic unit of relatively lower permeability.

(5) "Bentonite" means a highly plastic, highly absorbent colloidal clay composed largely of swelling sodium montmorillonite, meeting APT bentonite specifications (API specification 13A - Section 4).

(6) "Borehole" means an open or cased subsurface hole created by drilling.

(7) "Casing" means tubing which is installed to counteract caving and isolate the zone being monitored of a drilled hole.

(8) "Casing, protective" means a section of pipe or tubing that is placed over the well casing at the surface to provide structural protection to the well and restrict unauthorized entrance into the well.

(9) "Casing, surface" means a single section of tubing used to stabilize a borehole near the surface during and following the drilling of the hole.

(10) "Cement" means Portland cement, usually furnished in 94 pound bags.

(11) "Confined groundwater" means groundwater within a geologic unit(s) that is under pressure significantly greater than atmospheric pressure; the upper limit of the geologic unit being the bottom of a zone of distinctly lower hydraulic conductivity than that of the geologic unit(s) in which the confined water occurs.

(12) "Confining bed" means a layer of geologic materials having very low hydraulic conductivity that hampers the movement of water into and out of an aquifer.

(13) "Contamination" means the degradation of natural water quality as a result of man's activities. There is no indication of specific limits, since the degree of permissible contamination depends upon the intended use, or uses, of the water.

(14) "Cuttings" means fragments or particles of soil or rock, with or without free water, created during the drilling of a borehole.

(15) "Deionized water" means water that contains less than 50 milligrams per liter of dissolved solids.

(16) "Drilling fluid" means a liquid or gas which may be used in the drilling operation to remove cuttings from the borehole, to clean and cool the bit, to reduce friction between the drill stem and the borehole wall, and to seal the borehole to prevent loss of drilling fluids.

(17) "Flowing well" means a well from which water flows from the casing top under natural hydro-dynamic pressure.

(18) "Gravel pack" means the principal filter pack of a well

or monitoring device.

(19) "Groundwater" means water encountered below ground surface.

(20) "Grout" means an impervious or low permeable inorganic material used for the purpose of preventing interaquifer contamination and/or surface water infiltration. The term includes:

(a) Asphaltic concrete means a mixture of dense graded sand or sand and gravel and asphalt cement with less than 8% air voids.

(b) Bentonite clay grout means a mixture of at least 1.5 pounds of bentonite clay per gallon of potable water.

(c) Bentonite pellets and chips means particles of bentonite passing a 3/4 inch sieve and retained on a #4 sieve.

(d) Compacted clay cuttings means uncontaminated cuttings, a sample of which can be rolled into a thread of 1/8 in diameter or smaller, compacted to a density of at least equal to the formation from which they were cut. Bentonite powder passing a #200 sieve may be mixed with the cuttings. When attempting to roll the thread, particles of sand and gravel larger than a #40 sieve may be removed.

(e) Cuttings slurry grout means a mixture of uncontaminated water and a minimum of 15% solids by weight consisting of uncontaminated clay or shale cuttings, and a minimum of 10% bentonite by weight. The mixture shall have a unit weight of at least 9.00 pounds per gallon.

(f) Granular bentonite means a bentonite sand size particles, most of which passes a #4 sieve and most of which are retained on a #200 sieve.

(g) Neat cement grout means a mixture of not more than six gallons of potable water per 94-pound sack of Portland cement. Up to five pounds of bentonite clay per sack of cement may be added. When bentonite is added, the quantity of water may be increased 0.1 gallon for each pound of bentonite per sack of cement. Commercial fly ash may be substituted on a weight basis for up to half of the Portland cement.

(h) Portland cement concrete means a mixture of sand, Portland cement, potable water, and 4 to 8% air. May contain gravel. Fly ash may be substituted for up to 25% of the Portland cement. Shall contain at least six sacks of cement per cubic yard and have a 28-day compressive strength of at least 4,000 psi.

(21) "Grouting" means the operation by which grout material is placed in the borehole.

(22) "Hazardous" means a condition where materials or fluids contain sufficient types and amounts of biological, chemical, or physical (including radiological) agents which are likely to cause human illness, disorders, or disability. These include, but are not limited to, pathogenic viruses, bacteria, parasites, toxic chemicals and radioactive isotopes.

(23) "Hydraulic conductivity" means a property of the geological material expressing the relative ease with which water flows through the geological material in response to a differential in total hydraulic head.

(24) "Hydraulic gradient" means the rate of change in total head per unit of distance of flow in a given direction.

(25) "Injection well" means a well utilized for injecting fluids or gases into geologic materials.

(26) "Leachate" means contaminated water resulting from the passage of direct precipitation, surface water, or groundwater through waste.

(27) "Lysimeter" means a device used to obtain soil moisture samples above the water table.

(28) "Monitoring well" means a well that is used for monitoring ground water quality or flow direction, but is not used for withdrawing ground water for purposes other than water quality sampling or pump testing.

(29) "Monitoring Well Log Report form" means the form required by the department of natural resources and conservation to be filed for each monitoring well completed.

(30) "Neutron tube" means tubing installed in a borehole for the purpose of measuring soil-water content by neutron moderation techniques. Neutron tubes are constructed of a variety of materials, including plastic, fiberglass, fluorocarbons, or metal.

(31) "Non-biodegradable fluidizing admixtures" means grout additives that provide temporary reduction of gel strength by dispersing the clay particles. Non-biodegradable limits the use to only those additives not subject to biological decomposition. Natural polymers are biodegradable and may not be used. Totally synthetic polymers must be used with care, and only after determining that they are chemically acceptable can they be introduced into fresh water systems.

(32) "Non-hydrologic geotechnical" means the purpose of the hole is not to collect hydrologic information. Geotechnical is information on geological, geochemical, and geophysical conditions.

(33) "Observation well" is a well designed to measure the exact depth to the water table. An observation well is often screened or perforated across the water table.

(34) "Packer" means a transient or dedicated device placed in a well, which plugs or seals a portion of the well or well annulus at a specific level.

(35) "Permeability" means a measure of relative ease with which a porous medium can transmit a liquid under a potential gradient. It is a property of the medium that is dependent upon the shape, size, and degree of interconnection of the pores.

(36) "Piezometer" is a well designed to measure the hydraulic potential (water level elevation) at a specific point in the subsurface.

(37) "Radius of influence" means the radial distance from the center of a pumped well to the point where there is no lowering of the water table or potentiometric surface (the edge of the cone of depression).

(38) "Recovery well" means a well installed to recover contaminates that have been introduced into the ground water table, but is not used for monitoring ground water quality or flow direction.

(39) "Saline seep" means an artificially created ground

water system of poor quality, created by a change in the land use, which generally occurs in materials of very low transmissivity.

(a) "Saline seep well" means a well used for recharge area identification and for monitoring water table levels.

(40) "Static water level" means the elevation of the top of a column of water in a well, which is no longer influenced by effects of installation, pumping, or other temporary conditions. Static water levels are transitory and therefore will change due to temporal and seasonal effects.

(41) "Surfactants" mean synthetic detergents.

(42) "Transmissivity" means the rate at which water of prevailing kinematic viscosity is transmitted through a unit width of an aquifer under a unit hydraulic gradient.

(43) "Tremie pipe" means a pipe or tube that is used to transport grout or other material from above ground surface into a borehole annulus of a monitoring well or other groundwater monitoring device.

(44) "Unconfined aquifer" means an aquifer in which hydrostatic pressures at the water table are equal to atmospheric pressure. In unconfined aquifers, the water table is exposed to the atmosphere through openings in the overlying materials.

(45) "Vapor detection well" means a well or borehole used to obtain soil-gas samples above the water table.

(46) "Water cement ratio" means the proportion of the weight of mixing water to the weight of cement.

(47) "Water table" means the surface in an unconfined aquifer at which the pressure is atmospheric. This level is determined at a location by the static water level in a monitoring well or piezometer screened across the top of the zone of saturation.

(48) "Well screen" means pipe or cylindrical tubing with slots of a uniform width, orientation, and spacing.

(49) "Zone of saturation" means a hydrologic zone below the water table in which the interstices are filled with groundwater.

36.21.802 EXCLUSIONS Exclusions from these construction standards include the following wells:

(1) recovery wells;

(2) all wells less than 10 feet deep;

(3) vapor detection wells that do not penetrate the water table;

(4) lysimeters;

(5) neutron tubes;

(6) injection wells for the oil and gas industry;

(7) holes drilled for non-hydrologic geotechnical information.

(8) piezometers and observation wells in dams;

(9) monitoring wells installed under the authority of another governmental agency where the construction standards of that agency are more stringent than these rules; and

(10) special cases, with prior approval of the board.

36.21.803 MONITORING WELL CONVERSION A well used for monitoring purposes may not be converted to a water supply well, unless it meets minimum water well construction standards (Title 36, chapter 21, sub-chapter 5, ARM), has board approval, and complies with the department of natural resources and conservation's water rights statutes. (Title 85, chapter 2, MCA).

36.21.804 MONITOR WELL CONSTRUCTION MATERIALS (1) The well screen configuration, construction, and type of material used should be based on the in-field environmental and physical conditions.

(2) Drilling fluids which will contaminate the aquifer shall not be used.

(3) In areas of known contamination, materials which will not corrode in the environment in which they are placed shall be used.

(4) The well screen and well casing shall be new and be of sufficient structural strength to protect the integrity of the well.

36.21.805 SEAL MATERIALS (1) The intent of this rule is to provide protection to the ground water at least equal to the soil or rock profile penetrated by the borehole or excavation. More stringent standards set by other local, state, or federal agencies shall be followed when applicable.

(2) Acceptable seals for rotary or dug holes [air, fluid, auger (solid and hollowstem), backhoe] include:

- (a) above the water table:
 - (i) neat cement grout or Portland cement concrete,
 - (ii) bentonite clay grout,
 - (iii) cuttings slurry grout,
 - (iv) compacted clay cuttings,
 - (v) pre-wetted granular or powdered bentonite,
 - (vi) compacted asphaltic concrete,
 - (vii) other materials or methods with board approval;
- (b) below the water table:
 - (i) neat cement grout, tremied or pumped,
 - (ii) bentonite clay grout, tremied or pumped,
 - (iii) cuttings slurry grout, tremied or pumped,
 - (iv) bentonite pellets or chips,
 - (v) other materials or methods with board approval.

(3) For driven wells acceptable seals are granular or powdered bentonite.

(4) Jetted or other installation methods are not recommended for monitoring well use and will be considered only on an application basis.

36.21.806 INSTALLATION OF SEALS (1) In installing and developing a monitoring well, care shall be taken to preserve the natural barriers to ground-water movement between aquifers. All grouting shall be performed by adding the mixture from the bottom of the space to be grouted toward the surface in one continuous operation, except for driven wells.

(2) The minimum grout thickness shall be one and one-half

inches around the outside of the casing on all sides, except for driven wells.

(3) For driven wells, granular or powdered bentonite shall be fed alongside the casing.

(4) Seal material shall extend down to within five feet of the zone being monitored. In sand and gravel formations, a minimum of 10 feet of surface seal shall be used, except when the zone of monitoring is higher.

(5) If the borehole will be advanced through a confining bed immediately below a contaminated aquifer, a casing shall be sealed into the top of the confining bed prior to advancing the borehole through the confining bed. All contaminated tools, drilling fluids, and down-hole equipment shall be cleaned or treated prior to advancing the borehole through the confining bed.

(6) A monitoring well encountering an artesian condition shall be sealed and controlled in the same manner as an artesian water well (ARM 36.21.658).

36.21.807 PREVENTION OF CONTAMINATION BY EQUIPMENT

(1) Preventive measures shall be performed to ensure against contamination from equipment used to install or sample monitoring wells. Particular care must be exercised when equipment used to install or sample monitoring wells in contaminated environments is subsequently used to install production wells for domestic use.

(2) When practicable or feasible, monitoring well installation should proceed from areas with no or low levels of contamination to areas with higher levels of contamination.

(3) If contamination is detected during installation of a monitoring well, down-hole equipment should be decontaminated before use on another well or at another site. Appropriate methods of cleaning or decontamination will depend upon the level and type of contaminants, but may include steam cleaning, rinsing with uncontaminated water, or thorough cleaning with surfactants and deionized water.

(4) Contamination of down-hole equipment on the drill rig itself by hazardous materials requires thorough cleaning to prevent transport of hazardous contaminants to other locations. On-site decontamination may be necessary under particularly hazardous conditions.

36.21.808 SITE PROTECTION AND SECURITY (1) The top of the well shall be fitted with a tight fitting slip cap, threaded plug or cap, or locking cap. Monitoring wells within the radius of influence of a well used as a domestic supply well and hydraulically connected to the aquifer from which the well is drawing water shall have a locking cap or be surrounded by a fenced controlled enclosure.

(2) The following are suggested methods for site protection:

(a) If the well is cased with metal and completed above the ground surface, a lockable watertight cap may be welded to the top of the casing.

(b) If the well is not cased with metal and completed above the ground surface, a metal protective casing may be installed around the well. The protective casing may extend at least six inches above the top of the well casing and at least two feet into the ground. A lockable cap may be welded to the top of the protective casing.

(c) If the well is completed below ground surface, a lockable "water-meter cover," or equivalent, may be installed around the well. The cover must be designed to withstand the maximum expected loadings. A watertight seal on the casing itself shall be installed to prevent the inflow of surface water. Drains may be provided, when feasible, to keep water out of the well and below the well cap.

(3) The well(s) completed above ground may be protected from damage by one of the following suggested methods:

(a) Three metal posts at least three inches in diameter may be installed in a triangular array around the casing. Each post may extend at least three feet above and below the ground surface.

(b) A reinforced concrete pad may be installed to prevent freeze/thaw cracking of the surface seal. When a concrete pad is used, the annular seal shall be contiguous to the concrete pad.

(c) Other methods agreed upon by the well owner and the monitoring well constructor may be used.

(4) The final surface should be sloped away from the monitoring well. If slabs or pavements prevent this, the surface should be sealed with at least four inches of Portland cement or asphaltic concrete. A surface condition which allows surface runoff to run down the side of the casing or borehole is unacceptable and shall be repaired.

36.21.809 MONITORING WELL REPORTS (1) A licensed monitoring well constructor shall prepare a monitoring well report form for each monitoring well drilled. The monitoring well constructor shall supply copies of the report to the monitoring well owner and the department of natural resources and conservation within 60 days of completing the well. The monitoring well constructor shall retain a copy as a record in his files.

MONTANA DEPARTMENT OF NATURAL RESOURCES & CONSERVATION



BOARD OF WATER WELL CONTRACTORS

**1520 EAST SIXTH AVENUE
HELENA, MONTANA 59620-2301**

(406) 444-6643

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